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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
GOOD JOHNSON, MOTILEWA

ART UNIT	PAPER NUMBER
2672	7

DATE MAILED: 09/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/371,972	IOURCHA ET AL.	
	Examiner	Art Unit	
	Motilewa A. Good-Johnson	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 23-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18 and 23-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This action is responsive to the following communications: application, filed on 08/10/1999; IDS, paper #4, filed on 01/3/2000; Preliminary Amendment A, filed on 02/14/2000; Amendment B, filed on 07/23/2001; Amendment C, filed on 03/25/2002; Amendment D, filed on 09/03/2002; Amendment E, filed on 02/24/2003.

This action is made final.

2. Claims 1-18 and 23-29 are pending in this application. Claims 1, 8, 9, 13-15, 23 and 27 have been amended.

3. The present title of the application is "System and Method for Rasterizing Primitives using Direct Interpolation" (as originally filed).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-18, and 23-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Wood et al., U.S. Patent Number 6,204,856, "Attribute Interpolation in 3D Graphics", class 345/429, 03/2001, filed 07/1998.

As per independent claim 1, in a graphics system, a computer-implemented method of rendering a graphic primitive . . . method comprising: receiving a signal from an interface . . . about a plurality of vertices of the primitive and an independent variable; Wood discloses input to receive attribute data of the vertices, col. 5, lines 32-35; determining a channel value for each of the plurality of vertices of the primitive . . . ; Wood discloses determining a parameter value of a position within a triangle from the attribute value at each vertex, col. 2, lines 6-19; randomly selecting an interior point . . . ; Wood discloses determining parameter values for positions within a triangle, col. 2, lines 12-14; selecting at least two side points . . . ; Wood discloses calculating pixel attribute values by interpolating values at each triangle vertices, col. ,2 lines 1-5; determining an interpolated channel value with an interpolation engine . . . ; Woods discloses interpolation means, col. 2, line 50; and determining a channel value . . . . Wood discloses calculating parameter values for position within a triangle from stored attribute values form each triangle, col. 2, lines 14-19.

With respect to dependent claim 2, determining the interpolated channel value for each of the at least two side points further comprises performing linear interpolation . . . Wood discloses using incremental interpolation, col. 1, lines 51-61, and interpolation means, col. 2, lines 51-51.

With respect to dependent claim 3, determining the interpolated channel value for each of the at least two side points further comprises performing perspective interpolation . . . Wood discloses perspective correction by interpolation, col. 3, lines 53-65.

With respect to dependent claim 4, repeating each of the steps in claim 1 for a plurality of points . . . Wood discloses performing tests for each sample point during interpolation, col. 10, lines 49-50.

With respect to dependent claims 5-7, channel value represents color (luminance; texture). Wood discloses attribute data including color and texture, col. 1, lines 20-22. Wood further discloses shading calculating done on a per pixel basis, col. 9, lines 63-67, and further discloses not compromising attributes for shading and texturing, col. 11, lines 62-65, thus making it inherent to include luminance parameters for interpolating.

As per independent claim 8, it is rejected based upon similar rational as above independent claim 1. Wood further discloses performing a routine to the input data, col. 5, lines 36-41.

As per independent claim 9, it is rejected based upon similar rational as above independent claim 1.

With respect to dependent claims 10 and 11, determining the channel values of end points of the first (second) edge to determine the channel value . . . Wood discloses calculating control values along each edge of a triangle along with the triangle attributes, col. 1, lines 51-61.

With respect to dependent claim 12, using depth values of the first point and second point to determine a channel value . . . Wood discloses using depth values for projecting the model, col. 1, lines 25-35.

As per independent claim 13, it is rejected based upon similar rational as above independent claim 1. Wood further discloses performing a routine to the input data, col. 5, lines 36-41.

As per independent claim 14, it is rejected based upon similar rational as above independent claim 1. Wood further discloses interpolation means, data handling means, calculation means, projections means and pixel shading means, col. 2, lines 46-67.

As per independent claim 15, it is rejected based upon similar rational as above independent claim 1.

As per independent claims 23 and 27, they are rejected based upon similar rational as above independent claim 1.

With respect to dependent claims 24 and 25, they are rejected based upon similar rational as above dependent claims 5 and 7.

With respect to dependent claim 26, calculating a screen-based Z coordinate for the point based upon the independent variable X, vertex values . . . and depth values . . . Wood discloses using the homogeneity divisor, depth value to give spatial coordinates, col. 1, lines 25-35.

With respect to dependent claim 28 and 29, they are rejected based upon similar rational as above dependent claims 2 and 3 respectively.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-18 and 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the book "Computer Graphics Principles and Practice" by Foley et al., in view of Shochet, U.S. Patent Number 6,108,007, "Method, System, and Computer Program Product for Increasing Interpolation Precision using Multi-Channel Texture Mapping", class 345/582, 08/2000, filed 10/1997.

As per independent claim 1, in a graphics system, a computer-implemented method of rendering a graphic primitive . . . method comprising: receiving a signal from an interface . . . about a plurality of vertices of the primitive and an independent variable; determining a channel value for each of the plurality of vertices of the primitive . . . ; randomly selecting an interior point . . . ; selecting at least two side points . . . ; determining an interpolated channel value with an interpolation engine . . . ; and determining a channel value . . . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

However, it is noted that Foley fails to disclose receiving a signal from an interface with channel values or parameter data. Shochet discloses data comprising an

image sample and further discloses the data consisting of a single channel value, col. 2, lines 35-64, and further discloses an interpolator unit and determining an interpolated pixel value. It would have been obvious to one of ordinary skill in the art at the time of the invention of Foley to include means for receiving the three-dimensional graphics data through the interface of Shochet because it is necessary to include input data for graphics processing.

With respect to dependent claim 2, determining the interpolated channel value for each of the at least two side points further comprises performing linear interpolation . . . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

With respect to dependent claim 3, determining the interpolated channel value for each of the at least two side points further comprises performing perspective interpolation . . . Foley discloses a z-buffering technique, pages 668-672. Shochet discloses determining an appropriate projection, col. 1, lines 54-55.

With respect to dependent claim 4, repeating each of the steps in claim 1 for a plurality of points . . . Foley discloses calculating a z value for each pixel or polygon point, page 668. Shochet discloses accumulating data for a number of samples, col. 3, lines 22-23.

With respect to dependent claims 5-7, channel value represents color (luminance; texture). Foley discloses using color components for interpolation, page

737. Shochet discloses color, luminance and or texture channel values, col. 3, lines 5-7.

As per independent claim 8, it is rejected based upon similar rational as above independent claim 1.

As per independent claim 9, it is rejected based upon similar rational as above independent claim 1.

With respect to dependent claim 10, determining the channel values of end points of the first edge to determine the channel value . . . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

With respect to dependent claim 11, determining the channel values of end points of the second edge to determine the channel value . . . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

With respect to dependent claim 12, using depth values of the first point and second point to determine a channel value . . . Foley discloses using depth values of the first and second points to determine the interior point, pages 668-672, see also Figure 15.23.

As per independent claim 13, it is rejected based upon similar rational as above independent claim 1.

As per independent claim 14, it is rejected based upon similar rational as above independent claim 1.

As per independent claim 15, it is rejected based upon similar rational as above independent claim 1.

As per independent claims 23 and 27, they are rejected based upon similar rational as above independent claim 1.

With respect to dependent claims 24 and 25, they are rejected based upon similar rational as above dependent claims 5 and 7.

With respect to dependent claim 26, calculating a screen-based Z coordinate for the point based upon the independent variable X, vertex values . . . and depth values . . . Foley discloses a z-buffering technique, pages 668-672. Shochet discloses determining an appropriate projection, col. 1, lines 54-55.

With respect to dependent claim 28 and 29, they are rejected based upon similar rational as above dependent claims 2 and 3 respectively.

Response to Arguments

8. Applicant's arguments filed 06/30/2003 have been fully considered but they are not persuasive.

Applicant argues that Wood fails to disclose randomly selecting an interior point. Wood discloses in figure 5, element 510, choosing a point. It is inherent that the if one

selects a point without a pattern or unsystematically, the point chosen is chosen at random, see figure 1, Wood, and figures 2A-2C of applicants drawings each show a point P chosen at random. Applicant further argues that Woods discloses determining values at positions within the triangle and not randomly selected points. It is further inherent that if the invention of Woods determines values for interior points within a triangle, the invention of Woods meets Applicant's claim limitation of random points, because the interior points selected are selected at random and any interior point, random points, adjacent points, etc., within a polygon can be determined.

Applicant further argues that Foley, Shochet or the combination fails to disclose randomly selecting an interior point to determine an interpolated channel value. . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19. Applicant argues that Foley teaches sequentially processing scan lines, and interpolating across scan lines and that the requirement of a line-by-line traversal to fill a span across a line is not a randomly selected point. Foley discloses the interpolation across a scan line and by indicating an equation, in which input values are used to determine the output of a selected point, this allows the invention of Foley to used randomly selected points to plug into the equation, which is not dependent upon the scan lines.

Applicant argues that Foley and Shochet both teach sequential interpolation and not randomly selecting an interior point. Foley and Shochet both teach scan line

information to determine the endpoints of the triangle, and once the endpoints have been determined in a line by line traversal the point selected is an interior point selected at random and the equation is used to determine the interior point parameters.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Motilewa A. Good-Johnson whose telephone number is (703) 305-3939. The examiner can normally be reached on Monday - Friday 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Motilewa A. Good-Johnson
Examiner
Art Unit 2672

mgj
August 26, 2003

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
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